

CLAIMS

## WHAT IS CLAIMED IS:

1. A powered air cleaning system comprising:  
a flow path extending through the system from an inlet to an outlet;  
5 a motor-driven fan located along the flow path to draw particulate debris laden air into the inlet and rotate it about an axis to form a rotating flow that stratifies the debris laden air with the heaviest particles in the outermost orbits of the rotating flow;  
an ejector port for ejecting particulate debris laden air from the stratified rotating flow in the system; and  
10 an air filter located within the rotating flow and across the flow path upstream of the outlet for filtering air from the innermost orbits of the stratified rotating flow, the air filter being elongated in the direction of the axis about which the debris laden air is rotated;  
wherein the ejector port is located radially outward of the outermost orbits of  
15 the rotating flow.
2. The air cleaning system according to claim 1, wherein the filter is located centrally within a separator-ejector chamber in the flow path of the air cleaning system.
- 20 3. The air cleaning system according to claim 1, wherein the ejector port is elongated in a direction along the length of the elongated filter.
4. The air cleaning system according to claim 1, wherein an outer  
25 peripheral surface of the elongated filter is cylindrical.

forming a rotating flow of the debris laden air in the system at a positive air flow pressure to stratify the flow with the heaviest particles in the outermost orbits of the rotating flow;

5 ejecting particulate debris laden air from the outermost orbits of the stratified, positively pressured rotating flow in the system through an ejector port located radially outward of the outermost orbits of the rotating flow; and

10 withdrawing air from the innermost orbits of the rotating flow in the system through an air filter and an outlet of the system by applying a vacuum to the outlet, wherein the air filter is swept by the rotating flow to provide a self cleaning action on the filter.

23. The method according to claim 22, including operating the motor-driven fan to maintain the positive air flow pressure to eject particulate debris laden air from the outermost orbits of the stratified rotating flow in the system at all rates of withdrawal of air through the outlet of the system.

24. The method according to claim 22, wherein the ejector port is in the form of a slot in a housing containing the rotating flow, the slot extending in a direction transverse to the direction of rotation of the rotating flow.

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